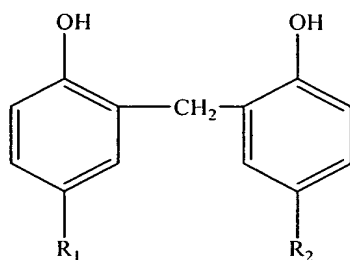


**THAT WHICH IS CLAIMED IS:**

1. A color-developing agent resin composition, which contains:

Component 1: a phenolic resin having a formula I shown as follows:

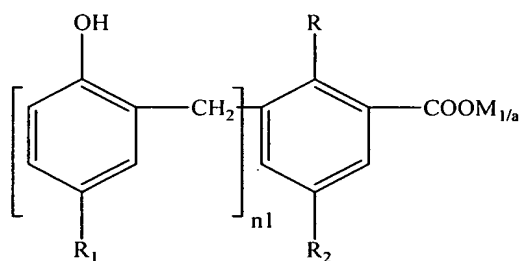
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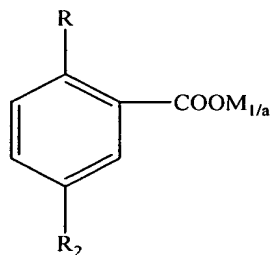
(I)

and

Component 2: a blend of graft copolymers of a phenolic resin and a  
 10 multivalent metal salt polymer of a substituted aryl carboxylic acid, said graft  
 copolymers are represented by formula II and III as follows:



(II)



(III)

15

wherein,

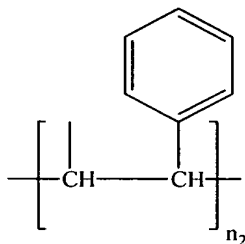
R is C<sub>1</sub>-C<sub>4</sub> linear alkyl, hydroxy or halogen;

R<sub>1</sub> is individually C<sub>1</sub>-C<sub>12</sub> linear or branched alkyl, C<sub>1</sub>-C<sub>12</sub> halohydrocarbyl,  
 20 C<sub>6</sub>-C<sub>12</sub> aryl, C<sub>7</sub>-C<sub>12</sub> aralkyl;

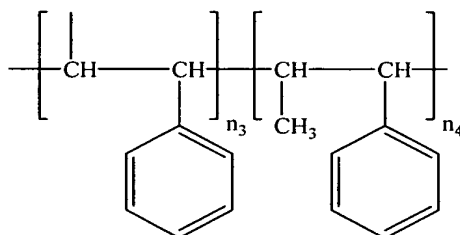
$$n_1 = 1-2$$

M is a multivalent metal ion; a represents the valence of M;

R<sub>2</sub> has a structure as follows:



5



wherein  $n_2$  is an integer of 1-100, preferably 1-10;  $n_3 + n_4$  is an integer of 1-100, preferably 1-10.

10

2. The color-developing agent resin composition of claim 1, characterized in that the content of the component 1 is 5-50 % by weight, and the content of the component 2 is 95-50 % by weight.

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3. The color-developing agent resin composition of claim 1 or 2, characterized in that the content of the component 1 is 10-30 % by weight, and the content of the component 2 is 90-70% by weight.

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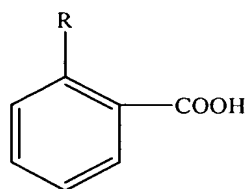
4. A color-developing agent resin emulsion, which contains:

- (1) the color-developing agent resin composition of claim 1 or 2; and
- (2) an emulsifying agent.

5. The color-developing agent resin emulsion of claim 4, characterized in that the emulsifying agent is selected from a surfactant, a modified starch or a polyvinyl alcohol.

6. A method for preparing the color-developing agent resin composition of claim 1 or 2, comprising the steps as follows:

(1) synthesizing the polymer of a substituted aryl carboxylic acid and an alkenyl benzene in the presence of a catalyst in an inert solvent by using the substituted aryl carboxylic acid or ester having a general formula (IV) as follows and an alkenyl benzene as feedstocks, and reacting the polymer with a multivalent metal ion to form a multivalent metal salt polymer of substituted aryl carboxylic acid as an intermediate;



(IV)

wherein, the definition of R is the same as that in claim 1;

(2) melting the mixture of a *p*-substituted phenol, the substituted aryl carboxylic acid having a general formula (IV), a metal oxide and a catalyst, and reacting them;

(3) adding the intermediate of step 1 to the reaction product of step 2, and reacting at 80-150 °C for 30-150 minutes;

(4) reacting the reaction product of step 3 with an aldehyde under refluxing at 80-130 °C for 1-10 hours;

(5) dehydrating the reaction product of step 4 at a temperature of 90-150 °C under a vacuum of 0.02-0.06 mPa; and

(6) cooling the dehydrated product and milling to reach a required particle size range.

7. The method of claim 6, characterized in that,  
the molar ratio of the substituted aryl carboxylic acid to the *p*-substituted phenol in step 2 is 0.05-1.55:1.0 and the molar ratio of the metal oxide to the substituted aryl carboxylic acid is 0.02-1.30:1.0;  
5 the molar ratio of the metal salt of substituted aryl carboxylate to the *p*-substituted phenol in step 3 is 0.05-5.0:1.0;  
the molar ratio of the aldehyde to the *p*-substituted phenol in step 4 is 0.06-2.0:1.0.
- 10 8. The method of claim 6, characterized in that wherein the inert organic solvent used is selected from solvents containing no benzene, such as organochlorines, alcohols, ethers, ketones.
- 15 9. The method of claim 8, characterized in that wherein the inert organic solvent used is selected from chloroethane, dichloroethane, trichloromethane, methanol, ethanol, propanol, butanol, isopropanol, isobutanol, dipropyl ether, diisopropyl ether, dibutyl ether, diisoamyl ether, acetone, butanone, pentanone, hexanone, hexanedione, heptanone and cyclohexanone.
- 20 10. The method of claim 6, characterized in that wherein the *p*-substituted phenol used is selected from alkylphenol, arylphenol, aralkylphenol or the mixture thereof.
- 25 11. The method of claim 10, characterized in that wherein the *p*-substituted phenol used is selected from *p*-methylphenol, *p*-ethylphenol, *p*-propylphenol, *p*-butylphenol, *p*-tert-butylphenol, *p*-amylphenol, *p*-hexylphenol, *p*-heptylphenol, *p*-octylphenol, *p*-tert-octylphenol, *p*-nonylphenol, *p*-decylphenol, *p*-undecylphenol, *p*-dodecylphenol, *p*-chlorophenol, *p*-bromophenol, *p*-phenylphenol and *p*-phenylalkyl phenol.
- 30 12. The method of claim 6, characterized in that wherein the aldehyde used is selected from formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, amylaldehyde and benzaldehyde.

13. The method of claim 6, characterized in that wherein the aldehyde used is a formalin of 37% by weight or 50 % by weight.

5           14. The method of claim 6, characterized in that wherein the substituted aryl carboxylic acid used is selected from C<sub>1</sub>-C<sub>4</sub> linear alkylphenyl carboxylic acid, halophenyl carboxylic acid, salicylic acid and esters thereof.

10           15. The method of claim 6, characterized in that wherein the metal oxide used is an oxide of metal selected from Mg, Ca, Cu, Cd, Al, Zn, Cr, In, Sn, Co, Ni, Ti and Ba.

16. The method of claim 6, characterized in that wherein the metal salt of substituted aryl carboxylic acid used is zinc salt.

15

17. The method of claim 6, characterized in that wherein the catalyst used is an acidic or a basic catalyst, or a specified surfactant.

20           18. The method of claim 6, characterized in that wherein the alkenyl benzene used is selected from vinyl benzene, propenyl benzene, butenyl benzene, butadienyl benzene, isobutenyl benzene and cyclo-alkenyl benzene and the like.

19. A method for preparing the color-developing agent resin emulsion of claim 4, comprising steps as follows:

25           emulsifying the color-developing agent resin composition of claim 1 or 2 with an emulsifying agent in an emulsifying machine to obtain an oil-in-water emulsion with the average particle size less than 1.5µm.

30           20. The method of claim 19, characterized in that the emulsifying agent comprises a surfactant, a modified starch or a polyvinyl alcohol.

21. A use of the color-developing agent resin composition of claim 1 as a resin color-developing agent for no-carbon copying paper.

22. A use of the color-developing agent resin emulsion of claim 4 as a resin color-developing agent for no-carbon copying paper.